DOE Workshop—Defining the Long Duration Energy Storage Challenge

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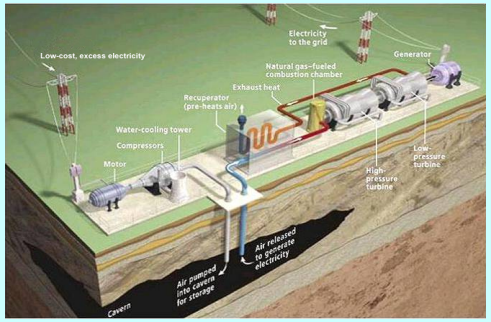
California Energy Commission Major Research Program

- **Electric Program Investment Charge (EPIC)—Administered by the CPUC**
  - Ratepayer-funded program to benefit ratepayers
  - Administered by the Energy Commission and three Investor-Owned Utilities (PG&E, SCE, and SDG&E)
  - Energy Commission Program ~ $130 M/year

Energy Storage and California's Future

- Energy Storage is a Big Part of California's Future:
  - Currently installed or approved energy storage in California is estimated at less than 2,500 MWs
  - CPUC Integrated Resource Plan projects the need for 9,846 MWs of energy storage by 2030
  - The CEC SB-100 draft planning documents estimate the need for between 20,000 MWs and 40,000 MWs of energy storage by 2045

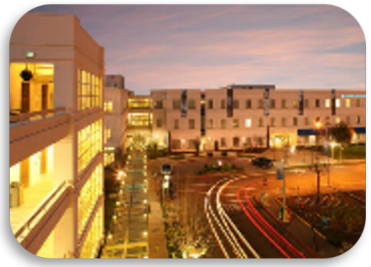
California Energy Commission has a Long History of Energy Storage Research



Diverse Combination of Microgrid Demonstration Projects by End Use

Critical Facilities

Shelter



Medical Center

Fire Stations

City Hall, Police HQ, and Community Centers

Waste Water Treatment Plant

Airport

Ports

Military

Communities

Industrial

Digester

Distribution Center

2020 is a Pivotal Year for Long Duration Energy Storage Research

- Over $100 million invested in energy storage in 2020
  - EPIC funds and awardee provided match funding
- Supporting new and emerging non-lithium-ion technologies
- Field demonstrations of non-lithium ion longer duration energy storage
  - 11 demonstration grants awarded—8 demonstrating 10+ hours of duration
    - Two grants demonstrating 20+ hours of duration
- 8 grants awarded in the applied research area
  - 3 grants piloting from 20 hours to 100+ hours of energy storage duration
  - 3 Grants for green hydrogen energy storage applications
- Two grants awarded to study the best use of long-duration energy storage and to develop deployment scenarios to meet California's energy goals

Future Planned Research: Optimizing Long-Duration Energy Storage to Improve Grid Resiliency and Reliability in Under-resourced Communities

- EPIC Team has submitted the 2021-2022 Investment Plan to the CPUC
  - Includes 9 new initiatives
  - One Initiative is for Long Duration Energy Storage
    - 24-36 hours of duration with energy storage and renewables
    - Can be three levels of complexity:
      - Renewable and energy storage
      - Renewables, energy storage and integrated energy management system
      - Full microgrid
  - Demonstrations only in under—resourced communities (DAC / LI / NAT)
      - Highest priority for communities in wildfire zones or with prior PSPS events

Open Discussion